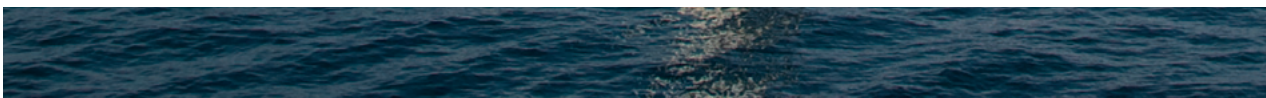
Offshore wind power projects

Answers for energy.

SIEMENS



Offshore projects

1 **Walney, UK, 2010–2011**
102 turbines [1)]

2 **Burbo Banks, UK, 2007**
25 turbines

3 **Rhyl Flats, UK, 2009–2010**
25 turbines [1)]

4 **Lynn/Inner Dowsing, UK, 2008**
54 turbines

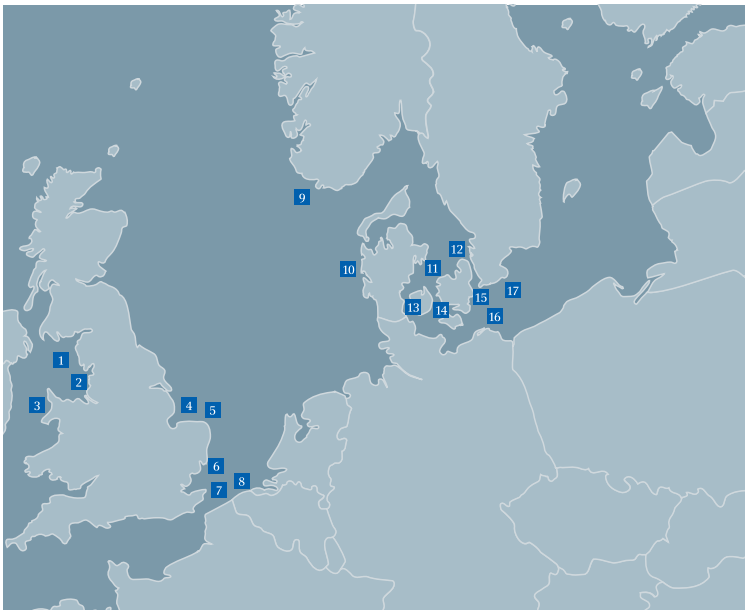
5 **Sheringham Shoal, UK, 2011**
88 turbines [1)]

6 **Greater Gabbard, UK, 2010–2011**, 140 turbines [1)]

7 **Gunfleet Sands, UK, 2009**
48 turbines [1)]

8 **London Array, UK, 2012**
175 turbines [1)]

9 **Hywind, NO, 2009**
1 turbine [1)]



10 **Horns Rev II, DK, 2009**
91 turbines [1)]

11 **Samsø, DK, 2000**
10 turbines

12 **Middelgrunden, DK, 2000**
20 turbines

13 **Vindeby, DK, 1991**
11 turbines

14 **Rødsand II, DK, 2010**
90 turbines [1)]

15 **Lillgrund, SE, 2007**
48 turbines

16 **Baltic I, DE, 2010**
21 turbines [1)]

17 **Nysted/Rødstand, DK, 2003**
72 turbines

[1)] Planned

When it comes to offshore wind power, no supplier can match Siemens in experience and stability. Siemens has a proven and unique offshore track record, ranging from the world's first offshore wind farm almost 20 yeas ago to today's largest offshore projects. All projects have been delivered on time and on budget, and have recorded high availability. Optimized processes across the complete project lifecycle make Siemens a stable, reliable and trustworthy business partner.

Siemens has not only supplied the world's first, but also the world's largest offshore projects. The 165-MW Nysted offshore wind farm has held the record as the largest offshore project for several years now. This record is expected to be broken when the 200-MW Horns Rev II project is commissioned. The 500-MW Greater Gabbard project, currently in progress in the UK, would raise the bar again. And the world's first 1-GW wind turbine project, London Array, would represent yet another stride towards large-scale green energy supply. All record projects – and all featuring Siemens wind turbines.

Projects in progress

Horns Rev II, Denmark
Location: Blåvandshuk, North Sea
Installed capacity: 209.3 MW
Scope of supply: 91 x SWT-2.3-93
Distance to shore: 27–35 km
Water depth: 9–17 m
Operator: Dong Energy

Gunfleet Sands, U.K
Location: Thames Estuary, North Sea
Installed capacity: 172,8 MW
Scope of supply: 48 x SWT-3.6-107
Distance to shore: 7–9 km
Water depth: 8 m
Operator: Dong Energy

Rhyl Flats, U.K
Location: North Wales, Irish Sea
Installed capacity: 90 MW
Scope of supply: 25 x SWT-3.6-107
Distance to shore: 8–10 km
Water depth: 6.5–12 m
Operator: RWE power renewables

Greater Gabbard, U.K.
Location: Thames estuary, North Sea
Installed capacity: 504 MW
Scope of supply: 140 x SWT-3.6-107
Distance to shore: 25 km
Water depth: 32 m
Operator: Scottish & Southern Energy

Baltic I, Germany
Location: NE Germany, Baltic Sea
Installed capacity: 48.3 MW
Scope of supply: 21 X SWT-2.3-93
Distance to shore: 7 km
Water depth: 16–19 m
Operator: EnBW

Rødsand II, Denmark
Location: SE Denmark, Baltic Sea
Installed capacity: 207 MW
Scope of supply: 90 x SWT-2.3-93
Distance to shore: 25 km
Water depth: 5.5–12 m
Operator: E.ON Sweden

Sheringham Shoal, U.K.
Location: Greater Wash, North Sea
Installed capacity: 316.8 MW
Scope of supply: 88 x SWT-3.6-107
Distance to shore: 17–22 km
Water depth: 14–20 m
Operator: Statoil-Hydro, Statkraft

London Array (Phase 1), U.K.
Location: Outer Thames Estuary, North Sea
Installed capacity: 630 MW
Scope of supply: 175 x SWT-3.6-120
Distance to shore: 20 km
Water depth: 2–23 m
Operator: Dong Energy, E. ON., Masdar

Walney, U.K.
Location: Irish Sea
Installed capacity: 367,2 MW
Scope of supply: 51 x SWT-3.6-107 and 51 x SWT-3.6-120
Distance to shore: 14 km
Water Depth: 19–24 m
Operator: Dong Energy

Total Siemens Offshore Capacity
Installed*: 642 MW

Turbine types	Installed*
450kW	5 MW
2.0 MW	40 MW
SWT-2.3	313 MW
SWT-3.6	284 MW

* as of June 2009

References

1991
Vindeby, Denmark
Location: near Lolland, Baltic Sea
Installed capacity: 4.95 MW
Scope of supply: 11 x 450
Distance to shore: 1.5 km
Water depth: 3–7 m
Operator: Dong Energy

The world's first offshore wind power plant was constructed 1.5 km off the Danish coast, near the port of Vindeby (windy city in Danish). To protect against corrosion, the turbines were built with airtight towers and nacelles, and are colled by heat exchangers.

2000
Middelgrunden, Denmark
Location: near Copenhagen, Öresund
Installed capacity: 40 MW
Scope of supply: 20 x 2.0
Distance to shore: 3.5 km
Water depth: 2–6 m
Operator: Dong Energy, Middelgrundens Vindmøllelaug

Middelgrunden was established in the autumn of 2000, on a natural reef with 3 to 8 meters water depth, 3.5 km outside Copenhagen harbor. This offshore wind farm is the largest in the world based on cooperative ownership.

2002
Samsø, Denmark
Location: near Samsø, Kattegat
Installed capacity: 23 MW
Scope of supply: 10 x SWT-2.3-82
Distance to shore: 3.5 km
Water depth: 12–18 m
Operator: Samsø Havvind A/S

The Danish island of Samsø produces renewable energy far in excess of the local energy consumption. The key reason for that remarkable fact is the locally owned offshore wind farm installed by Siemens.

Rønland, Denmark
Location: near Thyborøn, North Sea
Installed capacity: 9,2 MW
Scope of supply: 4 x SWT-2.3-93
Distance to shore: 0–1 km
Water depth: 2 m
Operator: Vindenergi ApS

The four turbines are installed in shallow water in a near-shore environment off the Danish peninsula Rønland.

2003
Rødsand (Nysted), Denmark
Location: Southern Denmark, Baltic Sea
Installed capacity: 165.6 MW
Scope of supply: 72 x SWT-2.3-82
Distance to shore: 6–10 km
Water depth: 6–9 m
Operator: Dong Energy, E.ON Sweden

The wind farm itself is made up of eight rows of nine turbines each. The 72 wind turbines annually generate enough power to supply 145,000 homes with environmentally friendly energy.

Frederikshavn, Denmark
Location: near Frederikshavn, Kattegat
Installed capacity: 2.3 MW
Scope of supply: 1 X SWT-2.3-82
Distance to shore: 1 km
Water depth: 2 m
Operator: Dong Energy

The 2.3 MW turbine is located on a jetty off the Danish harbor of Frederikshavn.

2007
Burbo Bank, U.K
Location: Liverpool Bay, Irish Sea
Installed capacity: 90 MW
Scope of supply: 25 x SWT-3.6-107
Distance to shore: 7–12 km
Water depth: 7–12 m
Operator: Dong Energy

Burbo Bank is exposed to the full force of the wind from west. The Irish Sea and its shifting sands were once feared by sailing ships, whereas today, these winds and shallow waters make it an ideal location for offshore wind turbines.

Lillgrund, Sweden
Location: near Malmö, Öresund
Installed capacity: 110 MW
Scope of supply: 48 x SWT-2.3-93
Distance to shore: 6–7 km
Water depth: 4–13 m
Operator: Vattenfall

The Lillgrund wind farm was officially commissioned in June 2008. It is located off the coast of southern Sweden, just south of the Öresund Bridge. With its 48 wind turbines, Lillgrund is Sweden's largest offshore wind farm and one of the largest in the world. The wind farm generates 0.33 TWh of power annually. This corresponds to the domestic electricity demand of more than 60,000 homes.

2008
Lynn / Inner Dowsing, U.K
Location: East coast of England, North Sea
Installed capacity: 194.4 MW
Scope of supply: 54 x SWT-3.6-107
Distance to shore: 5–6 km
Water depth: 6–13 m
Operator: Centrica

Lynn and Inner Dowsing are two adjacent wind farms constructed 5 km off the Lincolnshire coast, east of Skegness. Together, they have an installed capacity of 194 MW and are expected to provide enough power to meet the annual demand of more than 130,000 homes.

2009
Hywind, Norway
Location: North Sea, Norway
Installed capacity: 2.3 MW
Scope of supply: 1 X SWT-2.3-82
Distance to shore: 12 km
Water depth: 220 m
Operator: Statoil-Hydro

Hywind is the world's first full-scale floating wind turbine.

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